Weathering

Review from Sed. Rx

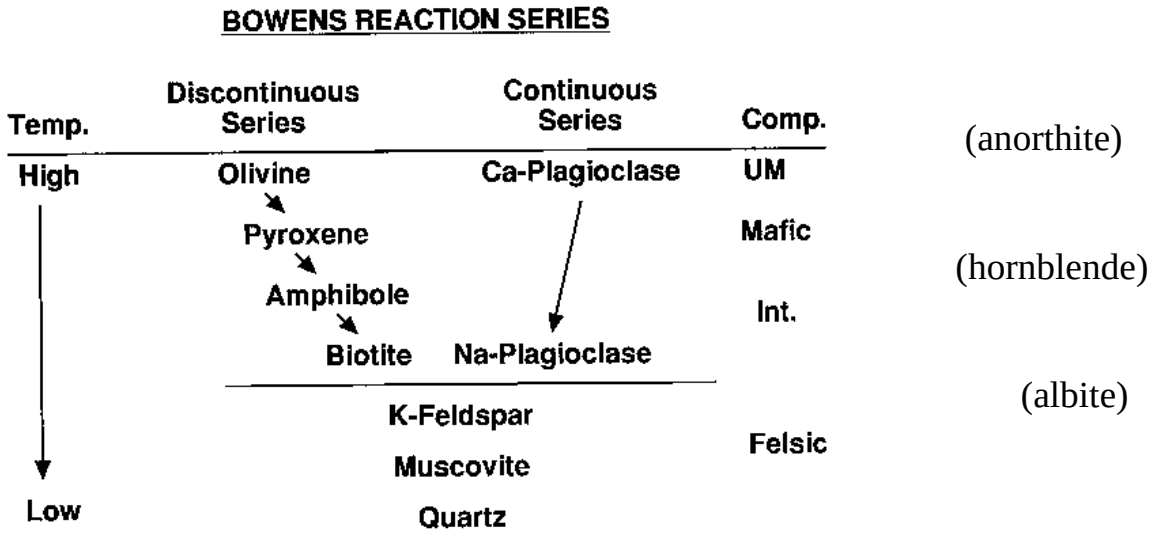
1) **Mechanical wx** = physical disintegration of rx
   a) Thermal shattering
   b) Frost wedging
   c) Abrasion (rubbing)
   d) Plants – roots, chemicals (e.g. lichen)
   e) Animal & insect burrows (*biotubation*)

2) **Chemical wx** = dissolving of ions in the rx
   a) Affects some ions :. some minerals more susceptible
      i) mafic & feldspars → silt & clay
      quartz → sand

Wx. effects –

1) sheeting – caused by relief of overburden
2) exfoliation ("outside leaf") – rounding off of edges, curved sheets
   a. domes (Ex. Half Dome)
   b. slabs a danger to climbers
3) spheroidal wx – as above but operates on all sides of isolated boulders

Minerals Wx. in same order they xlize in Bowen's Reaction Series



Soil Formation

Regolith == whole surface covered by wx products (sed.)

Soil == sed. with organic matter that can support vegitation
(There's no such thing as "dirt")

The Soil Profile

- Formed over long time (~10,000yrs)
- Grow deeper with time (as underlying bedrock "decays")

O horizon – organic,decomposed veg.	• Loam, humus
A horizon – leached layer	• "Top soil", "plow layer" ~20 cm • leached = ions and clays removed • dark in color
B horizon – enriched layer	• ions and clay from above • hardpan, subsoil
C horizon – partially wx. bedrock	• saprolite (rotten rock)
	• bedrock • "parent material"

Soil Types – depends on:

1) climate
2) parent material
3) age
4) organic matter
5) slope (tendency to erode)

Types

1) laterite
    a. wet tropics, rain forests
    b. intense leaching (even SiO_2)
    c. leaves Fe, Al, oxides (bauxite)
    d. brick red
    e. lousy farmland, nutrient poor

2) pedalfer (Greek *pedon* = soil; "alfe" = Al Fe)
    a. These soils are rich in Al and Fe.
    b. They form in humid climates (>64 cm/yr), forests
    c. southeastern U.S.

3) pedocal ("cal" = calcium)
    a. rich in Ca.
    b. form in arid climates (< 64 cm/yr) e.g. southwestern U.S.
    c. where evap. rate is high contain **caliches** (or hardpan), a calcium carbonate deposit which accumulates in the soil
    d. southwestern U.S.

4) podzol (Russian = "under ashes") (podzolization)
    a. subarctic pine forests (U.S. Canada, Eurasia)
    b. pine needles makes percolating water acidic
    c. removes metallic cations (Na, Ca, K, Mg, Al, Fe) from A-horizon
    d. leaching of clays to B-horizon
    e. color banded red, yellow or black over gray.